

# Software To Improve Food Safety

Eating chicken wings should be a fun snack, not a deadly game of chance. That's why food technologist Thomas P. Oscar and his colleagues in ARS' Microbial Food Safety Research Unit at Princess Anne, Maryland, are constantly improving their risk assessment software—so poultry producers can make the right decisions about food safety.

Computer software that can help with tracking foodborne pathogens is becoming more important to meat producers in the wake of USDA's Hazard Analysis and Critical Control Points program. The HACCP regulation, which took effect in 1996, requires all poultry processors to identify potential contamination sites and take steps to reduce risk.

Last year, Oscar came out with S-RAMPP (Salmonella Risk Assessment Modeling Program for Poultry), a program that models each stage of poultry production by considering three microbial events:

- contamination—number of disease-causing microorganisms,
- reduction—effectiveness of controls,
- growth—speed at which microorganisms take hold and grow.

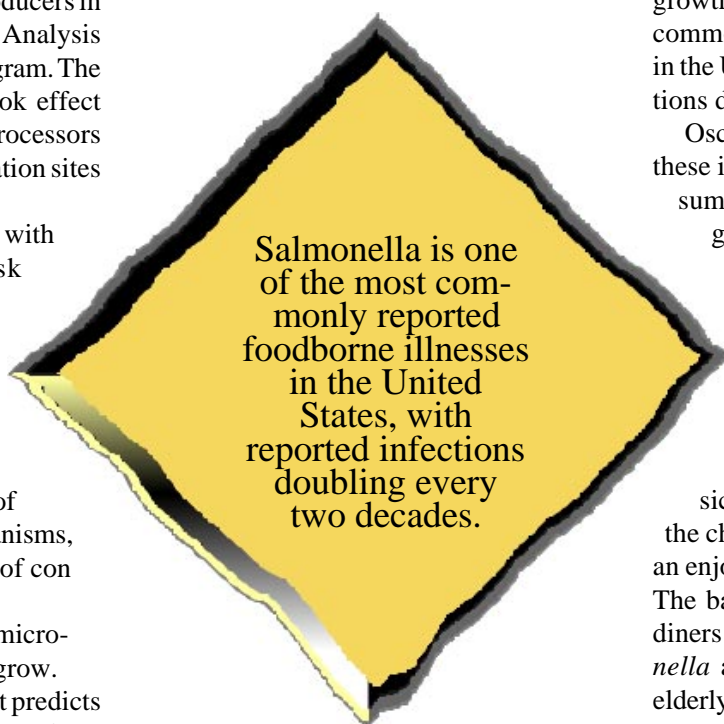
Based on this information, it predicts the numbers of *Salmonella* organisms on poultry at each stage of production and helps poultry producers decide where they can apply efforts to improve food safety.

When S-RAMPP came out, it caught the attention of several major poultry producers. These companies have been using the program to pre-test such HACCP strategies as where to put an extra washer, whether to increase chlorine levels, or which changes will be most economical and effective.

S-RAMPP is based on current scientific knowledge and hundreds of experiments done by Oscar's research team to find how quickly *Salmonella* grow on

poultry, based on time, temperature, and pH.

A release of the program, in December 1998, includes *Campylobacter*, another important human pathogen found on poultry. It is called Poultry FARM-UP (Poultry Food Assess Risk Model for Human Pathogens). It is easier to use than S-RAMPP.



But Oscar isn't stopping there. He's going back to the lab to change how his research team gathers data so future programs will be even more reliable. One way he's doing that is by changing how the lab grows *Salmonella* samples.

"Instead of using a laboratory medium, we're going to be growing samples on chicken parts such as breast and thigh meat," he says. "Using real meat cuts will allow us to study how competing microorganisms affect *Salmonella* growth."

To differentiate the *Salmonella* from other bacteria, Oscar plans to use *Salmonella* tagged with jellyfish genes to make them glow. He obtained these special *Salmonella* from microbiologist Pina Fratamico at ARS' Eastern Regional Research Center in Philadelphia, Pennsylvania.

Oscar says he also plans cooperative projects with industry to see how ingredients in commercial chicken franks or patties slow or accelerate bacterial growth. *Salmonella* is one of the most commonly reported foodborne illnesses in the United States, with reported infections doubling every two decades.

Oscar is also considering ways to use these industry-focused data to help consumers. One of his ideas is a computer game named "Banquet" that could, in a fun, humorous way, teach consumers the serious lessons of food safety.

By combining his data with data from other agencies on how much of a pathogen is needed for people to get sick, Oscar envisions a game where the chef's decisions could create either an enjoyable meal or a culinary disaster. The banquet's guest list would include diners particularly vulnerable to *Salmonella* and *Campylobacter*, such as the elderly and people with compromised immune systems.

"So much of food safety is about consumer education," says Oscar. "All the efforts made at the processing plant or the grocery store to keep meat safe are in vain if the person preparing the food doesn't use the same kind of care in preventing foodborne illness."—By **Jill Lee**, ARS.

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